REMARKS

The present response does not amend, add, or cancel any claims. Accordingly, claims 8-10 and 12 remain pending in the application. Claim 8 is independent.

In the Office Action of August 20, 2009, claims 8, 10, and 12 were rejected under 35 USC §103(a) as being unpatentable over Japanese Patent Publication No. JP 2002-063927 to Yamamoto et al. ("Yamamoto") in view of U.S. Patent Application No. 2004/0095023 to Jacobson et al. ("Jacobson"). Claim 9 was rejected under 35 USC §103(a) as being unpatentable over Yamamoto in view of Jacobson, and further in view of U.S. Patent Application No. 2002/0131285 to Kawakami and U.S. Patent Application No. 2003/0159865 to Schmidt. These rejections are respectfully traversed.

In rejecting the claims, the Office Action continues to allege that that Yamamoto discloses a fuel cell system as set forth in the instant claims. In particular, the Office Action asserts that Yamamoto discloses a first converter connected to an electric power system, a set of fuel cells connected to a second converter which outputs to a DC circuit, a secondary battery connected to the DC circuit through a third converter and the second converter, and a load connected in parallel with the first converter. The Office Action indicates that Yamamoto further discloses a control unit that controls the functions of all devices in the system, as well as a current sensor which detects the current from the fuel cells. Furthermore, the Office Action indicates that Yamamoto discloses the secondary battery outputting a power value via the third converter corresponding to the power value

that the receiving power exceeds the preset receiving power value due to the increase in the load power.

The Office Action admits that Yamamoto fails to disclose detecting the currents and voltages, and calculating the power at particular points in the circuit.

Jacobson is relied upon for teaching voltage and current sensors in each segment of a system and sending those values to the control unit, as well as calculating the power in each segment using the current and voltage values obtained via the sensors. The Office Action concludes that it would have been obvious to have the current and voltage sensor in each segment of the system so that the controller will have information needed to accurately maintain the output power necessary to power the system, and to quickly determine where a problem/fault lies. The Office Action further admits that Yamamoto fails to disclose a second power converter outputting power so that it approaches the average value of the load power and having current control means to control the current command of the power converter to equal the current of the fuel cell and secondary battery, respectively. However, these features were considered nothing more than discovering the optimum or workable ranges, or only requiring ordinary skill in the art. Applicants respectfully disagree.

Independent claim 8 defines a fuel cell system control unit that comprises:

> a first power converter electrically connected to an electric power system;
>
> an electric load connected to an electric line which ties the electric power system and the first power converter;
>
> a set of fuel cells connected to a DC circuit of said first power converter through a second power converter;
>
> a secondary battery connected to said DC circuit through a third power converter;

a system voltage detecting means which detects an AC voltage on the power system and outputs its detected value;

a receiving current detector for detecting the receiving current which is total of a current flowing through said first power converter and a current flowing through an the electric load;

means for calculating a receiving electric power based on the receiving current detected by said receiving current detector and the system voltage detected by said system voltage detecting means;

means for controlling said third power converter so that said receiving power does not exceed a receiving power threshold value;

means for calculating the output power of the secondary battery;

means for calculating the output power of the set of fuel cells;

means for calculating the load power which the load consumes based on the receiving power, the output power of the secondary battery, and the output power of the set of fuel cells;

means for calculating an average value of the load power by filtering the load power calculated;

means for controlling the second power converter so that the output power of the set of fuel cells approaches the average value of load power; and

means for controlling the first electric power converter so that a DC side voltage of the first electric power converter approaches a predetermined DC voltage instruction value.

The fuel cell control unit of independent claim 8 includes a first power converter that is electrically connected to an electric power system, an electric load that is connected to an electric line which ties the electric power system and the first power converter, a set of fuel cells connected to a DC circuit of the first power converter through a second power converter, a secondary battery connected to the DC circuit through a third converter, and a system voltage detecting means for detecting an AC voltage on the power system and outputting its detected value. A receiving current detector is provided for detecting the receiving current which is a

total of the current flowing through the first power converter and the current flowing through the electric load. The fuel cell control unit includes means for calculating a receiving electric power based on the receiving current detected by the receiving current detector and the system voltage detected by the system voltage detecting means, as well as means for controlling the third power converter so that the receiving power does not exceed a receiving power threshold value. The fuel cell control unit further includes means for calculating the output power of the secondary battery; means for calculating the output power of the set of fuel cells; means for calculating the average load power which the load consumes based on the receiving power, the output power of the secondary battery, and the output power of the set of fuel cells; means for calculating an average value of the load power by filtering the load power calculated; and means for controlling the second power converter so that the output power of the set of fuel cells approaches the average value of the load power. Furthermore, according to independent claim 8, a means is provided for controlling the first electric power converter so that the DC side voltage of the first electric power converter approaches a predetermine DC voltage instruction value.

At the outset, Applicants submit that the Office Action has not addressed each limitation recited in the independent claims, as required to make a *prima facie* case of obviousness. For example, independent claim 8 specifically indicates that a receiving current detector is provided for detecting the receiving current which is the sum of current flowing through the first power converter and the current flowing through the electric load. Rather, the Office Action indicates that Yamamoto discloses a current sensor for detecting the current from the fuel cells. As clearly illustrated in Drawing 1 of the Yamamoto, the current sensor (or ammeter 49) only measures the current from the fuel cell (6). The electric load (accessory load 71)

identified by the Examiner is not located such that the current sensor (49) would be able to detect the current flowing through both the fuel cells and the electric load. Additionally, the current detector identified in the Office Action does not detect the current flowing through the first power converter at all. Despite the clear recitation that the receiving claimed current detector detects a receiving current that is the total current flowing through the first power converter and through the electric load, this feature is never addressed. Rather, a broad generalization is made that Yamamoto provides a current detector capable of detecting the current from the fuel cells. Yamamoto is completely silent on such features and the Figures contradict the assertions made in the Office Action.

Since Yamamoto fails to disclose a receiving current detector as set forth in the claimed invention, then this reference necessarily fails to disclose a means for calculating a receiving electric power that is based on the receiving current detected by the receiving current detector, as well as the system voltage detected by the system voltage detecting means.

Next, the Office Action alleges that Yamamoto discloses a means for controlling the third power converter so that the receiving power does not exceed a receiving power threshold value. The Office Action further identifies the third power converter as reference number 78, and the control unit as reference numeral 95. Again, this statement appears to contradict what is plainly stated in the reference. Yamamoto never discloses or even suggests that the control device (95) controls the third power converter so that the receiving power does not exceed a receiving power threshold value. In fact, Yamamoto appears to be completely silent regarding any relationship between the third power converter and the control device. Rather, Yamamoto states that the control device changes a circuit and controls the

apparatus so that power can be supplied from the rechargeable battery to the accessory loads while the fuel cell system is being placed into operation. See paragraph [0065]. Thus, Yamamoto also fails to disclose the claimed feature of controlling the third power converter so that the receiving power does not exceed a receiving power threshold value.

As can be appreciated, Yamamoto provides a system wherein the auxiliary battery is controlled by the control unit only to provide power before the fuel cell actually becomes operational. There is no disclosure whatsoever for controlling the output of the battery. The control device appears to simply place the battery in either an ON or OFF position. Thus, the battery provides the full load power and is only utilized during the intermittent period between a loss of commercial power and initiation of power from the fuel cell. Yamamoto appears to provide no distinction between the load power and the receiving power. Furthermore, there is no discussion of an average value of the load power as set forth in the present invention.

In contrast, the present invention provides a fuel cell system control unit wherein the average value of the load power is determined in order to control the fuel cells to output a power that corresponds to such value. The secondary battery is then controlled so that its output can be adjusted to supplement the average power being supplied by the fuel cells in order to account for fluctuations in the load power. Consequently, it becomes possible to maintain a constant value for the receiving power under fluctuations of the load power.

Despite the assertions made in the Office Action, Yamamoto is completely silent on various features that are explicitly recited in independent claim 8. This silence cannot be arbitrarily interpreted as disclosing features of the claimed

invention. Rather, it appears that inappropriate hindsight reconstruction is being used to interpret this silence based on reading of the claims. Applicants further note that the remaining references also fail to provide any disclosure or suggestion for the same features that are lacking in Yamamoto. There is simply no disclosure or suggestion for features recited in independent claim 8, such as:

> a receiving current detector for detecting the receiving current which is total of a current flowing through said first power converter and a current flowing through an the electric load;
>
> means for calculating a receiving electric power based on the receiving current detected by said receiving current detector and the system voltage detected by said system voltage detecting means;
>
> means for controlling said third power converter so that said receiving power does not exceed a receiving power threshold value;
>
> means for calculating the output power of the secondary battery;
>
> means for calculating the output power of the set of fuel cells;
>
> means for calculating the load power which the load consumes based on the receiving power, the output power of the secondary battery, and the output power of the set of fuel cells;

It is therefore respectfully submitted that independent claim 8 is allowable over the art of record.

Claims 9, 10, and 12 depend from independent claim 8, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 8. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.

If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.